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On the determinants of labour market institutions:

Rent seeking vs. social insurance*

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Abstract
What determines the structure of labour market institutions? I argue that common explanations based on rent seeking are incomplete. Unions, job protection, and egalitarian pay structures may have as much to do with social insurance of otherwise uninsurable risks as with rent seeking. In support of this more benign complementary hypothesis the paper presents a range of historical, theoretical, and cross-country evidence. The social insurance perspective changes substantially the positive analysis of the future of European labour market institutions. It is not clear that globalisation and the "new economy" will force countries to make their labour markets more flexible. These phenomena will probably increase the efficiency costs of existing institutions, but they may also make voters more willing to pay a high premium to preserve institutions that provide insurance.

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1. Introduction

What determines the structure of labour market institutions? Many economists seem to agree that European labour market institutions mainly reflect the rent seeking activities of unions and employed insiders, and that these institutions create much wastage, in the form of unemployment, and wage structures that distort people's incentives to acquire human capital. As a corollary it is often argued that far-reaching labour market deregulation is the only way to improve the workings of the labour markets of continental Europe.

While rent seeking is a powerful motivator, so is the desire for social insurance. Since private markets are less likely to accommodate the demand for insurance against labour income risk, and since human capital is by far the most important asset for most individuals, a *laissez faire* economy need not be a very attractive place to live in. It is well known that this market failure can serve as a theoretical rationale for redistributive tax policy, and maybe even for the welfare state.[1] But it also suggests that many characteristics of European labour markets (like employment protection, compressed wage structures, and collective bargaining) can be thought of as second best instruments of risk sharing, which make up for the absence of a complete set of contingent markets.[2]

In this paper I discuss a range of evidence suggesting that labour market institutions serve an important function of social insurance. First, I review historical evidence on the origins of labour market institutions in two countries that are at the polar ends of the rigid-flexible spectrum, Sweden and the United States. This comparative evidence strongly suggests that many of the labour market rigidities that today are blamed as main causes of unemployment originally emerged as a defensive response to the threat of unemployment and income insecurity. Second, I present a simple model formalising the

[1] See e.g. Atkinson (1999), Barr (1987), Drèze (2000), Sandmo (1998) and Sinn (1995).
[2] The idea that labour market institutions can be thought of as devices that correct for market failures is not novel; see Blank and Freeman (1993), Gregg and Manning (1997) and Agell (1999) for further discussions.

idea that institutionalised wage compression (which is often viewed upon as the hallmark of the European labour market compact) can be thought of as a welfare enhancing device, which provides social insurance, albeit at a cost in the form of unemployment. Third, I report new empirical evidence on the determinants of labour market institutions, and on the link between trade integration and labour market structures.

The social insurance approach to institutional analysis has both normative and positive implications. Increased wage differentials are often seen as a key ingredient in a policy to combat European unemployment. But as I discuss below, it is conceivable that such labour market reform can be successful in lowering unemployment, at the same time that aggregate welfare *decreases*, because of a concomitant loss of social insurance. Moreover, it is common to argue that globalisation, and the move towards a more flexible organisation of the work place (think of the "new economy"), will bring about a gradual dismantling of European style labour market institutions. But if these developments increase the risks of investing in human capital, the demand for risk sharing via labour market institutions may well increase in the future.

My discussion has counterparts in the literature on the nature and origin of the welfare state. This is no surprise, since in much of Europe the institutions of the labour market and those of the welfare state are parts of the same system. The observation that the changing structure of the labour market is crucial in understanding social insurance is developed at length in e.g. Atkinson (1991) and Piore (1987). My analysis of institutional pay compression as a second best, risk sharing device draws on Agell and Lommerud (1992), and relates to e.g. Varian (1980) and Eaton and Rosen (1980). My econometric evidence relates to recent work on the determinants of growth and the size of government; see e.g. Easterly and Levine (1997), Rodrik (1998) and Alesina and Wacziarg (1998).

2. On the origin of labour market institutions

What comes first, the chicken or the egg? According to many economists job security legislation, unions and benefits create unemployment,[3] and a variety of other allocational inefficiencies. According to many social historians the main line of causation goes in the opposite direction – the very same institutions once developed as a defensive *response* to the threat of unemployment and income insecurity. Let me briefly review some of this evidence, gathered from the distant past when the new economy was a matter of railways and the steam engine, rather than dot.com. To focus my discussion, I concentrate on developments in two countries, which today often are considered to be opposite poles when it comes to labour market structures, the United States and Sweden.

In his study of the origin and evolution of unemployment in Massachusetts in the 19th century, Alexander Keyssar (1986) draws on a range of contemporary sources (newspaper articles, reports from charities, union protocols, government documents, etc.) to illuminate how structural change and modernisation altered the workings of the labour market. In the early (pre-industrial) days labour demand in Massachusetts was far from steady. Because of the extremities of the weather, and the frequent breakdown of the fragile transportation system, labour demand often slackened in an unpredictable manner. In spite of this, there is no evidence that unemployment was viewed as an important problem. Why? Keyssar's answer is that people could self-insure in a variety of ways. People had many jobs, and could shift between them. In times of bad harvests farmers became gunsmiths or carpenters; when the demand for craftsmen was slack, farming got

[3] I believe that this is an appropriate description of the views held by many macroeconomists, by economists at organisations like the IMF and the OECD, and by many academic economists who take part in the debate on high European unemployment; Agell (1999) gives a sample of references. At the same time I agree with one of the referees, who pointed out that labour economists often appear to adopt a more agnostic view towards the role of institutions in explaining high and persistent unemployment. For some empirical evidence that gives food for this latter view, see e.g. Card, Kramarz and Lemieux (1999), Nickell and Bell (1995) and Nickell and Layard (1999).

more intense. Moreover, most people owned a piece of land, which helped them to survive in case their cash incomes dried up. Finally, pre-industrial society had a tightly knit social fabric, which in hard times provided some shelter even to those who did not own property.

The process of industrialisation signalled the beginning of "the era of uncertainty." Between 1820 and 1870 the proportion of the labour force engaged in agriculture declined from nearly 60 percent to a little more than 10 percent. Production got more specialized, household manufacturing disappeared, and the factory system gained prominence. This transformation set the stage for increased standards of living, but it also introduced new disturbances to labour demand. The rapid pace of structural change implied that business failures – which at a moment's notice terminated the flow of cash income of dislocated workers – were common also in good times. There was also the new phenomenon of the business cycle. Beginning in the 1870s the economy was affected by recurring "panics", which curtailed activity throughout the state. These contractions seem to have got more severe in the 1890s, when technological advances made it possible to produce closer to the market, which obviated the need to produce for inventory.

At the same time that industrialisation added disturbances to the labour demand schedule, it also largely destroyed the traditional mechanisms of self-insurance. It was no longer easy to shift to farming or household manufacturing when the industrial sector stagnated. Rapid immigration and population growth meant that a growing share of the labour force lost its ties to the agricultural subsistence sector, and urbanization eroded the social fabric of pre-industrial society. All in all, Keyssar's analysis suggests that unemployment materialized as a problem because industrialization created new risks and destroyed the old institutions of risk sharing.

To a modern day economist, accustomed to the idea that rigid institutions are main causes of unemployment, an intriguing aspect of the historical evidence is that it

suggests that flexibility is no panacea for unemployment and income risk. By any reasonable standard the labour markets of historical Massachusetts must be characterized as extraordinarily flexible. There were hardly any formal regulations, nominal wage cuts appear to have been common, geographical mobility was high, etc. But in spite of this Keyssar's documentary material indicates that chronically unsteady employment and "involuntary idleness" was perceived as a major problem among large segments of the work force. The available statistical evidence – in the form of federal and state censuses, union surveys, etc. – corroborates this picture. It appears that the average unemployment rate exceeded 15 percent during the depressions of the 1870s and 1890s. For unskilled and semiskilled workers, unemployment rates were in all likelihood much higher. Unemployment also appears to have been a widely shared experience. In the bad years the frequency of unemployment (defined as the percentage of the work force with at least one spell of unemployment during a given year) might have been as high as 40 percent.[4]

Keyssar's documentation suggests that many of today's labour market institutions originally developed as a first line of defence against an unpredictable labour demand schedule. Towards the close of the 19th century trade unions grew in strength, and one of their most important original functions appears to have been to offer various forms of protection against unemployment and irregular cash income. These protective measures included a host of strategies. A first was to make it easier for the unemployed to find new jobs; for this purpose unions created job information offices, and provided travelling loans to members who were out of work. A second was to ease the financial consequences of unemployment; many unions paid out benefits – or, less ambitiously, gave loans – to their unemployed members. A third way of coping was to promote policies that spread work among as many people as possible during depressions; bans on

[4] In 1885 an average unemployment spell appears to have been between 4-5 months (Keyssar, 1986, p. 91).

overtime work, and demands that employers put every union member on 'short time' instead of laying off people, belong in this category. Finally, quite early on the "last hired, first fired"-principle of layoffs – a principle that most economists of today view as a major cause of inefficiency – became an important union strategy to shelter the incomes of more senior workers, who often had a family to support.[5]

In Sweden it is only towards the end of the 19th century that the process of industrialisation took off. The works of Montgomery (1951) and Olofsson (1996) indicate however that the unemployment issue in Sweden emerged well before[6] industrialised society, and that the first attempts at designing an unemployment policy in the modern sense of the word took shape already during the early 19th century. At that time rapid population growth and the commercialisation of agricultural production had turned a growing number of people into day labourers. In 1840 the government's bill about poor relief acknowledged that these workers were unable – due to no fault of their own – to support themselves in times of bad harvests, when the demand for day labour was slack. This shift of emphasis, which according to Montgomery (1951) took place gradually during the first decades of the 19th century, departed dramatically from the old view. Previously, unemployment was considered to be a criminal offence; now it was identified as a separate cause of poverty, worthy of special public attention. To mitigate the vulnerability of agricultural workers, the 1840-41 *Riksdag* decided that the unemployed should be provided with public relief works in years of bad harvests.

The second stage in the development of the unemployment issue in Sweden is the late 19th century, when industrialisation and urbanisation brought fundamental changes

[5] As suggested by one of the referees, the historical evidence on the introduction of the "last hired, first fired"-principle can just as well be interpreted as a rent seeking strategy of senior union members.
[6] The conclusion of Montgomery (1951) and Olofsson (1996) that the event of unemployment actually precedes the industrial revolution is in agreement with the French evidence reported by Salais et al. (1986). As suggested by Salais et al. part of the role played by modern labour market institutions was to make it

in the economic and social landscape. Like in Massachusetts this transformation was accompanied by a rapid increase in the strength of unions, and by considerable experimentation with various union strategies to cope with fluctuations in labour demand.[7] During the 1880s and 1890s there was also an intensifying political debate about the responsibility of the government to mitigate the risks (disability, sickness, unemployment, etc.) that confronted the workforce, and measures were introduced that limited the flexibility of product and labour markets.[8] With the stated purpose of maintaining the living standards of the agricultural population tariffs on agricultural imports were introduced in 1888. To monitor occupational hazards a work environment authority was created in 1889. As discussed by Montgomery (1951) it also appears that spending on poor relief in the cities started to vary in a counter-cyclical manner during the 1880s and 1890s.

Certainly, the historical evidence is of an impressionistic nature. All the same, I interpret it as a strong indication that the common rent seeking explanation for the emergence of labour market institutions misses a major part of the story. If anything, the experience of Massachusetts and Sweden seems to suggest that it is unemployment and income insecurity that – together with workers' risk aversion – created the institutions of the labour market, rather than the other way round. It is also noteworthy that in both countries important pieces of still existing social insurance legislation were introduced during the turbulent years of the 1930s.[9] More generally, the lesson seems to be that people's demand for intervention to mitigate risk can be expected to increase in times of

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possible to measure (and to understand the concept of) unemployment. I am grateful to one of the referees for pointing this out.

[7] Like e.g. financial support to unemployed members, demands to sign collective bargaining contracts regulating the termination of employment, and calls on employers to counter recessions by shortening the workweek rather than by laying-off workers. For information about these early activities of Swedish unions, see Casparsson (1966) and Edebalk (1975).

[8] I am grateful to Jan Ekberg for providing me with the following information, and for guiding me to the reference to Montgomery (1951).

greater uncertainty, like periods of rapid change and modernisation, and to the aftermath of economic crisis. As I will return to below, this lesson from the past has important implications for the analysis of the future of European style labour market institutions.

In spite of the historical similarities, one can hardly argue that current Swedish and U.S. labour market institutions have much in common. There are of course several reasons that may explain why institutions evolve differently in different countries, and why the incentives to create all encompassing labour market institutions appear to have been much stronger in Europe than in the United States. An interesting possibility, clearly suggested by Keyssar's analysis, is that large-scale foreign immigration may explain why the U.S. labour market eventually got such a flexible outlook. The workforce in Massachusetts was – and still is – a heterogeneous one, with sharp boundaries according to country of origin, language, ethnic background, etc. In this environment, characterised by competition and sometimes even open antagonism between ethnic groups, it was much more difficult to build up durable labour market institutions than in a much more homogenous country like Sweden.

Though I have emphasised the demand for social protection as a prime reason for the emergence of modern labour market institutions, rent seeking clearly played a role as well. In both Massachusetts and Sweden unions battled to increase wages at the expense of profits. There was also a fair amount of infighting between different unions, and between employed insiders and unemployed outsiders. Keyssar (1986, pp. 202-11) documents various methods – many of which have a strikingly modern ring – that unions used to keep outsiders at bay. Moreover, it appears that already early on vested interests tried to hijack the concept of social insurance. In summing up the state of social insurance in Germany at

[9] As noted by Krueger (2000), main features of U.S. protective labour legislation and social insurance – like Social Security, the minimum wage, and unemployment compensation – were established during the Great Depression. In Sweden, unemployment insurance sponsored by the government was introduced in 1934.

the close of the 19th century, Cassel (1900) wrote approvingly of a social policy that aimed at protecting the working class. He even argued that properly designed social policy was a powerful instrument to *promote* economic progress, and to induce people to accept change.[10] But he also cautioned his readership that the demand for public assistance in Germany had grown "…like mushrooms after a rainy day" (Cassel, 1900, p. 386). Since every producer and worker believed that the government had an obligation to protect them from adverse changes in the business climate, German tax and trade policies had become so protectionist that their main function appeared to be to maintain the *status quo*.

3. An insurance model of redistributive unions

A hallmark of the European labour compact is the strong emphasis on redistribution. Unions compress the wage structure, and governments redistribute income from high- to low-income earners. Judged against the yardstick of a perfectly competitive equilibrium model these policies are bound to create inefficiencies. But judged against the yardstick of an economy where private markets offer incomplete insurance against labour income risk matters need not be so bleak.[11] Thus, the absence of private insurance markets suggests a well-known role for government redistribution policy. By reducing the variance of disposable income a system of redistributive taxes and transfers may increase *ex ante*

[10] In defending social insurance against the proponents of *laissez faire*, Cassel (1900, pp. 387-388) wrote "…the main point in the defence of this policy must rest in the acknowledgement that the productivity of labour increases in parallel with the social position of the working class. The insight about this relationship is the most optimistic, but at the same time one of the most well-established, results of modern economic research" (my translation). Unfortunately, Cassel did not mention what research he had in mind.

[11] Here, and in the following, I simply take for granted that the private market is unable to fully accommodate people's demand for human capital related risk sharing. Presumably, the absence of private insurance (via insurance companies, or via "implicit contracts" between firms and individual workers) must have something to do with asymmetric information *ex ante* about workers' characteristics, and with the difficulty of implementing and enforcing long run, even life long, insurance contracts. For a discussion stressing the inability of private insurance to protect against lifetime career risk, see Sinn (1996). For a discussion of the evidence on uninsured lifetime risk in the labor market, see Storesletten et al. (2001).

welfare by providing an insurance effect in addition to the conventional equity and incentive effects; see e.g. Eaton and Rosen (1980) and Varian (1980).

But income redistribution via taxation is not the only way of providing insurance against random labour income. A more direct form of insurance can be provided through labour market institutions – unions, minimum wage laws, unemployment insurance – that narrow the wage distribution. As shown by Agell and Lommerud (1992), under general assumptions the insurance benefits from a small compression of the wage structure will outweigh any costs in terms of unemployment and reduced output. The representative worker is willing to exchange a lower expected wage for a wage structure that offers insurance against uncertainty concerning who-one-will-be in the wage distribution.

To see how institutional wage compression compensates for missing private insurance markets in a setting of idiosyncratic wage risk, and to see how far a social insurance approach can go in explaining why selfish individuals support redistributive wage policy, it is useful to work through a simple example. While the model clearly relies on exaggerated assumptions – luck, rather than effort, is the only thing that matters for people's occupational careers – it allows us to focus ideas in a simple manner. Consider a labour market that has L workers, and two types of jobs, for simplicity referred to as good (high-paying) and bad (low-paying) ones. Before the labour market opens, everyone knows that one half of the L workers will turn out to have the characteristics required for a good job, while the other half will turn out to have the characteristics required for a bad job. Since each individual supplies one unit of labour, aggregate labour supplies become

$$L_G = L/2 \tag{1}$$

$$L_B = L/2\,, \tag{2}$$

where the subscripts are self-explanatory.

The demand side is represented by a competitive production sector, which uses 'good' and 'bad' workers to produce a single good. To suppress all feedback effects from output markets, I assume that the good is sold at an exogenous price, determined in the international market. Workers of either type can only be gainfully employed on the corresponding type of job. In a competitive market wages for good and bad jobs, w_G and w_B, will then depend on labour supplies shown in (1) and (2), and on firms' production technology. I summarise this process of competitive wage determination by assuming that

$$w_G = 1 + k \tag{3}$$

$$w_B = 1 - k\,, \tag{4}$$

where k is a positive constant. From (1) through (4) it follows that the wage bill in the *laissez-faire* economy is simply L, and that by increasing k we may analyse the effects of a mean-preserving increase in wage inequality.

As there is no macroeconomic uncertainty w_G and w_B are known to workers before the labour market opens. However, I do assume that there is idiosyncratic risk: *ex ante*, before the labour market opens, individuals only know up to a probability distribution whether they will turn out to have the characteristics of a good worker (receiving w_G), or the characteristics of a bad worker (receiving w_B). I allow for individual heterogeneity by assuming that the probability of ending up as a good worker, π_i, may differ between individuals. To conform to the aggregate labour supplies shown in (1) and (2), the average of these probabilities across all individuals must (by the law of large numbers) satisfy $E(\pi_i) = 1/2$. Based on this aggregate implication I distinguish between three types of workers; talented ones, for which $\pi_i > 1/2$; average ones, for which $\pi_i = 1/2$; and untalented ones, for which $\pi_i < 1/2$. Finally, I assume that workers have identical utility functions $u(x)$, with $u' > 0$ and $u'' < 0$ (which implies strict risk aversion).

In this environment there will be a strong demand to create institutions that provide insurance against wage risk. Let me start with the well-known case of social insurance via redistributive taxation. Assume that the government relies on a tax system that transforms gross wages into net-of-tax wages according to

$$w_G^n = 1 + kT \qquad (3')$$

$$w_B^n = 1 - kT\,, \qquad (4')$$

where the tax system is redistributive when $T < 1$. Because there are as many good as bad jobs, the government's budget constraint is satisfied for any value of T.

What will optimal policy look like *ex ante*? Under the assumption that the decisive voter is characterised by probability π_i it is easy to show that T should be set so that the following, classic, insurance condition holds true:

$$\frac{\pi_i}{1-\pi_i}\frac{u'(1+kT)}{u'(1-kT)} = 1\,. \qquad (5)$$

When the decisive voter coincides with our average worker ($\pi_i = 1/2$), redistribution according to (3')-(4') is actuarially fair. She therefore desires full insurance, which implies that T should be set to zero, so that $w_G^n = w_B^n$. When the decisive voter is an untalented worker ($\pi_i < 1/2$) this insurance gain is reinforced by an equity effect in the form of an *ex ante* transfer from talented to untalented workers. For this reason untalented workers prefer a policy where T is *less* than zero, so that $w_G^n < w_B^n$.

When the decisive voter is a talented worker ($1 > \pi_i > 1/2$) the insurance and equity effects pull in opposite directions. The likelihood that the former dominates the latter increases with the concavity of the utility function; a sufficiently risk averse worker will support at least some redistributive taxation, even if the implied insurance premium is actuarially unfair. Also, the insurance effect is more likely to dominate the higher is wage

inequality in the *laissez-faire* economy. As pre-tax inequality increases, even a talented person will eventually support redistributive taxation to cushion a small downside risk of a very bad outcome. To see this, differentiate (5):

$$\frac{dT^*}{dk} = -\left[\frac{\pi_i u''(w_G^n) + (1-\pi_i)u''(w_B^n)}{\pi_i u''(w_G^n) + (1-\pi_i)u''(w_B^n)}\right]\frac{T^*}{k} \equiv -\frac{T^*}{k} \qquad (6)$$

Since the optimal tax rate, T^*, is always greater than zero for talented individuals, $dT^*/dk < 0$. Hence, as *k* increases we eventually reach the region where $T^* < 1$.

In a democratic society T^* will be determined in a voting process, which reflects the distribution of talent in the population; for seminal work on the determination of social insurance in voting models, see Persson (1983) and Wright (1986). If the decisive voter is the median one, and if the talent distribution is symmetric around the mean, tax policy will be highly egalitarian. As the median voter then faces a 50 percent chance of landing a bad job, there will be full wage insurance. The reason that the voting process delivers such an extreme outcome is of course that we have so far assumed that redistribution has no disincentive effects. If e.g. labour supply responds adversely to taxation, the median voter would opt for a less comprehensive social insurance policy. Similarly, in a dynamic setting, where workers believe that they will gradually climb the income ladder, the median voter might vote for a less redistributive tax policy (for a theoretical analysis of how the prospect of upward social mobility affects the demand for redistribution, see Benabou and Ok (2001)).

Let us now turn to the insurance that can be provided by an all-encompassing union, which uses its monopoly position in the labour market to flatten the wage structure. An implicit assumption in much of the union literature is that workers form unions because they want to bargain over wages in order to transfer rents from capital owners. Here, we rather assume that there are no rents to divide: the union maximises expected utility,

subject to the constraint that every dollar's wage hike for the bad jobs must be matched by a corresponding wage cut for the good jobs. We may think of this assumption as reflecting a situation when firms face some binding (zero) profit constraint, which the union cannot infringe upon. Formally, our all-encompassing union is confined to set wages according to

$$w_G^u = 1 + kW \qquad (3'')$$

$$w_B^u = 1 - kW\,, \qquad (4'')$$

where superscript *u* stands for union, and W is the distribution parameter. When $W < 1$ the union pursues an egalitarian wage policy; when $W = 0$ it sets the same wage for both jobs.

In line with our treatment of the government's decision problem, we assume that the union's objective is to maximise the expected utility of its decisive member, characterised by the talent-probability π_i. In line with the basic monopoly union model, we assume that the union unilaterally determines W, and that firms then determine employment according to their labour demand curves. But when firms are on their labour demand curves, a compression of the wage structure will lead to unemployment for those that hold the bad jobs. We formalise this by defining the employment rate of those that have the characteristics required for a bad job as $\gamma(W)$. We assume that $\gamma(0) < 1$, $\gamma(1) = 1$, and that $\gamma(W)$ is twice continuously differentiable, with $\gamma' > 0$.

The union's optimisation problem is

$$\max_W \quad \pi_i u(w_G^u) + (1-\pi_i)(\gamma(W)u(w_B^u) + (1-\gamma(W))u(R))\,, \qquad (7)$$

subject to (3'') and (4''), and where R is an exogenous reservation wage, determined by e.g. the value of leisure.[12] The first-order condition becomes

$$\frac{\pi_i}{(1-\pi_i)\gamma(W)}\frac{u'(1+kW)}{u'(1-kW)} = 1 - \frac{\varepsilon(u(1-kW)-u(R))}{kWu'(1-kW)}\,, \qquad (8)$$

where $\varepsilon \equiv \gamma'(W)W / \gamma(W) > 0$ has the interpretation of an employment elasticity, which we will treat as a constant in the following.

It is again helpful to start with the case when the average worker is the decisive union member. Unlike the case of redistributive taxation, the insurance provided by the union stops short of complete equalisation of incomes across states. The last term on the RHS is a correction term relative to first-best insurance. It implies a larger deviation from full wage insurance the harsher the consequences of unemployment (represented by the utility loss $u(1-kW)-u(R)$), and the larger the increase in unemployment (represented by the employment elasticity) following a marginal compression of wages.

A crucial question is under what conditions the average worker wants to implement a policy of wage levelling (i.e. set $W < 1$). The intuitive[13] answer is that he wants the union to pursue egalitarian wage policy as long as the reservation wage *R* is close to the *laissez-faire* wage for the bad jobs, $w_B = 1-k$. Starting in a situation when $R = w_B$ the insurance gain from a marginal compression of the wage structure will be of first-order importance, while the unemployment cost will be of second-order importance. By continuity, the average worker continues to support pay compression even as we reduce *R* marginally below w_B. Furthermore, denoting optimal wage policy by W^*, it is easy[14] to show that $dW^* / dR < 0$; i.e. an increase in the reservation wage induces the union to purchase additional insurance through pay compression. Thus, a more generous system of unemployment benefits gives the decisive union member an incentive to pursue a more

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[12] In (7) I assume that the decisive union member accounts for unemployment in his maximisation problem. This assumption is debatable. See Oswald (1985) for a survey of alternative union models.

[13] The formal proof is as follows. Consider a decisive union member with $\pi_i = .5$, and assume that $R = w_B$. Evaluating (8) when $W = 1$, it follows that the RHS is greater than the LHS. When $W = 0$, it follows that the RHS is less than the LHS. Thus, optimal *W* is in the open interval $(0,1)$.

[14] To show that $dW^* / dR < 0$, differentiate (8) implicitly with respect to *W* and *R*, and rearrange (while keeping in mind that ε is assumed to be a constant). To show that $dW^* / d\varepsilon > 0$, we proceed in a parallel manner. These results hold for *any* decisive union member, and not just for the average worker.

egalitarian wage policy. It is also easy to show that $dW^* / d\varepsilon > 0$; i.e. by increasing the marginal unemployment cost of pay compression a higher value of the employment elasticity implies that wage policy becomes less redistributive.

The analysis for the other types of workers parallels the case of redistributive taxation. Wage compression creates an *ex ante* equity effect, which benefits untalented workers at the expense of talented workers. For this reason, untalented workers support a more egalitarian wage policy than the average worker, while talented workers may oppose pay compression altogether.[15] And again, it follows that the incentive of a talented worker to support egalitarian wage policy is an increasing function of wage inequality in the laissez-faire equilibrium. If we differentiate (8) we obtain:

$$\frac{dW^*}{dk} = -\left[1 - \frac{\varepsilon\pi_i u'(w_G^u)}{\varepsilon\pi_i u'(w_G^u) + \Delta}\right]\frac{W^*}{k} < 0\,, \qquad (9)$$

where the sign follows from the fact that $W^* > 0$ for a talented worker, and that $\Delta = \varepsilon(1-\pi_i)\gamma(u(w_B^u) - u(R) + kWu'(w_B^u)) - k^2W^2(\pi_i u''(w_G^u) + (1-\pi_i)\gamma u''(w_B^u)) > 0$. Thus, comparing two risk averse, talented individuals characterised by the same probability of acquiring a good job, the one who lives in the economy with the largest competitive wage differential will be the one most likely to support redistributive wage policy.

Ultimately, the union's wage policy will depend on the process used to weigh the utilities of different categories of members. Presumably, this process is a great deal more complicated than what is predicted by a median voter approach, according to which the union member with the median talent-probability will be the decisive one. A theory of

[15] Consider a diagram where the x-axis represents different values of *W*, and the y-axis measures the values of the LHS and RHS of (8). In this diagram the curve representing the LHS slopes downwards, and the curve representing the RHS slopes upwards. The optimal wage differential, *W**, is determined at the point of intersection of these curves. Based on footnote 13 we know that *W**<1 when the decisive union member is characterised by $\pi_i = .5$. It is easy to see that increasing π_i above .5 (the decisive member is a talented worker) leads to an upward shift in the curve representing the LHS, and an intersection of the two curves at a

redistributive unions must account for the fact that dissatisfied union members have an exit-option. Talented workers finding that wage policy has become too redistributive may simply leave the union, and create a new (more homogeneous) union of their own. To properly study this issue one would need to address difficult problems concerning coalition formation in a union setting – issues that are well beyond my present purpose.[16]

The model has a number of normative implications. Our redistributive union is responsible for creating unemployment, but in spite of this expected utility of the average worker will be higher than in a *laissez-faire* equilibrium with no unemployment – unemployment is simply the cost associated with second-best wage insurance. But a redistributive government does a still better job than a redistributive union, since the government provides insurance, without the unemployment that follows from the union's interference with relative factor prices. For the average worker, the three equilibria are ranked as follows: a redistributive government reaches the first best, a redistributive union the second best, and the unregulated market the third best.

Let me then turn to the positive implications. First, the model suggests that the demand for risk sharing institutions ought to increase with the fraction of the workforce that faces uncertainty about their future position in the wage distribution. It also indicates that redistributive tax or wage policy will have the widest support in economies where workers are relatively homogeneous, in the sense that they face similar uncertainties concerning their future labour income. In practice, and in line with our historical evidence, one would perhaps expect that the insurance demand for a narrow wage distribution is the strongest in times of rapid structural change, or in periods of macroeconomic turmoil, when

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point with a less redistributive wage policy. Similarly, decreasing π_i below .5 (the decisive member is an untalented worker) leads to an intersection with a more redistributive wage policy.

[16] Another problem is due to the fact that any social insurance contract is susceptible to an intrinsic time consistency problem. *Ex post*, lucky workers have an incentive to renege on *ex ante* efficient wage contracts. For a discussion of these issues, see Burda (1995).

established economic relations are disrupted. Under those circumstances, one would expect that many workers face uncertainty concerning their future position in the wage distribution. As a consequence, union members may then vote for a more egalitarian wage policy, while the electorate at large may vote for more redistributive taxation.

Second, our analysis suggests that the incentive to create union-sponsored institutions of risk sharing depends on the social safety net provided by the government. In the presence of an optimal tax system, where T is determined so that (5) holds, workers have no reason to form a redistributive union. But if the government reduces tax progression, workers get an incentive to join a redistributive union. Social insurance via the tax system is thus a substitute for wage compression.[17] In the case of unemployment benefits, operating via the reservation wage R, we obtain the opposite relation. If the government reduces R it follows from (8) that the union will pursue a less egalitarian wage policy. Thus, wage compression is a *substitute* to social insurance provided via redistributive income taxation, but a *complement* to social insurance provided via benefits.

Finally, there is the question of Cassel (1900) of whether social insurance can be designed in a way that encourages people to accept change, and to undertake risky activities. Sinn (1995) is one of the few who have studied this issue formally. He extends the model of redistributive taxation to the case when individuals can affect their income risk through their own actions, and he shows that the insurance provided by redistributive taxation may well enhance risk-taking. Sinn concludes that "…under the protection of the welfare state more can be dared." Our model has a similar interpretation. We may think of our bad and good jobs as being situated in a particular sector of the economy, or in a

[17] To the extent that redistributive wage policy is more socially costly than redistributive taxation, a weakening of the public safety net may simply imply that a less efficient instrument of social insurance replaces a more efficient one. Avi-Yonah (2000) makes the related point that by weakening social insurance, tax competition may unleash popular demand for protectionist trade policies. Political scientists have for long suggested that there might be an inverse relation between the extent of social protection provided by the welfare state and the tranquillity of a country's labour market relations; see Hibbs (1978).

particular occupation. In a laissez-faire equilibrium, a risk averse individual's decision to enter this particular sector, or occupation, will be adversely affected by the uncertainty concerning her place in the intra-sectoral, or intra-occupational, wage distribution. In either case, redistributive taxation or wage policy may – by reducing uncertainty – encourage people to take on the risk of entering the sector, or occupation, in question.

4. "Globalisation" and the institutions of the labor market

In what direction will European labour markets develop in the future? According to the conventional view, increased openness and the requirements imposed by the new economy will increase the costs of preserving institutions that hinder the flexible adjustment of relative wages. As a consequence governments sooner or later have to liberalise rigid labour market institutions, cut down on generous unemployment insurance, and implement measures that restrict the influence of rent seeking unions. But considerations of political economy suggest that this process is not automatic.

Figure 1 shows the marginal costs and benefits of redistributive tax or wage policy, as perceived by the decisive voter, or by the decisive union member. Under the standard assumption that the excess burden increases with the square of the tax wedge the marginal cost curve slopes upwards. Under the seemingly plausible assumption that a dollar's worth of income redistribution matters most at a low overall level of income redistribution, the marginal benefit curve slopes downwards. In the initial political economy equilibrium, the decisive voter chooses the amount of redistribution so that the marginal cost and benefit curves intersect, i.e. point *A*.

The popular view assumes that globalisation increases the efficiency costs associated with a given level of income redistribution; i.e. the marginal cost curve shifts upwards. We then end up in the political economy equilibrium at point *B*, where the new

cost curve intersects the old benefit curve. Clearly, there will be less income redistribution. But to the extent that globalisation for some reason also increases the decisive voter's demand for social insurance, there will in fact be a simultaneous upward shift in the benefit curve. We then end up at point *C*, where the new cost curve intersects the new benefit curve. Whether this final political equilibrium is associated with less or more income redistribution is an open question, on which it is hard to form a definite *a priori* opinion.

The cross-country evidence on the determinants of labour market institutions suggests that the analysis of Figure 1 is more than a theoretical peculiarity. Researchers have long suggested that the vulnerability of the open economy provides strong incentives to increase the scope of government. In an early study, Cameron (1978) showed that the trade to GDP ratio in 1960 was a good predictor of the growth of tax revenue in a sample of 18 OECD countries in the period 1960-75. He also found a positive correlation between openness and a measure of the scope of collective bargaining. Cameron suggested that this correlation was due to the fact that trade was accompanied by a high degree of industrial concentration, which facilitated the formation of employers' associations and strong unions. More recently, Rodrik (1998) has found evidence of a robust positive correlation between openness and indicators of the size of government in a much larger sample. The explanation offered by Rodrik is that government spending plays a risk-reducing role in economies exposed to a significant amount of external risk. In Agell (1999) I show plots suggesting that more open economies on average tend to have higher union density, more centralised wage setting, more compressed wage structures, higher minimum wages, etc.

4.1. Cross-country regressions

I next report new results on the determinants of labour market institutions for those countries for which there exist comparative data on labour market institutions, i.e. the members of the OECD. The benchmark (OLS) regressions are presented in Table 1. The dependent variables reflect a variety of often-discussed dimensions of labour markets and social security systems (see the Appendix for a discussion of the data). Columns 1 and 2 regress the net replacement rates for long- and short-term recipients against the independent variables. The replacement rates are taken from OECD (1999a), and show the combined impact of benefits, income taxes and various social welfare benefits for prototype families in 26 OECD countries in 1997. The numbers I use are averages across prototype families (in which the principal earner is an "average production worker"). These averages indicate that long-term recipients are most generously treated in Denmark, Iceland, the Netherlands, and Sweden (countries with net replacement rates exceeding 70 percent), and the least generously treated in Greece, the USA and Korea.

Columns 3 to 10 show regressions where the dependent variable is taken from Nickell and Layard (1999), who provide comparable information on labour market institutions in 20 OECD countries. These variables – which quantify the strictness of job security legislation, union density, the degree of coordination of wage bargaining, spending on active labour market policy, etc. – refer to the situation in the 1989-94 period. Finally, column 11 shows a regression for a measure of income inequality, the 90/10 percentile ratio of disposable income. According to this measure – taken from Gottschalk and Smeeding (1997) – Finland, Sweden, Belgium, and Norway are the least unequal countries (with 90/10 ratios below 3), while the USA and the UK are the most unequal ones (the US 90/10 ratio is 5.8, and the British one 4.7).

The small sample size means that there is no room for the joint inclusion of a great number of explanatory variables. My benchmark specification includes three independent variables, the log of openness, the log of GDP per capita, and a measure of linguistic fractionalisation. Both openness, defined as the sum of exports and imports over GDP, and per capita GDP are taken from the Penn World Tables, mark 5.6. To reduce problems of endogeneity openness and per capita GDP are measured in a period that precedes the measurement of labour market institutions (in columns 1 and 2 openness and per capita GDP are measured in 1990, and in columns 3-11 they are measured in 1985). Linguistic fractionalisation is an average value of five different indices, compiled by linguistic scholars, and contained in the data set of Easterly and Levine (1997). The summary measure that I use has a minimum of 0 (a country where everyone has the same language) and a maximum of 1 (a country where everyone has her own language). Table 2 shows the extent of linguistic fractionalisation among the OECD countries according to this index, as well as the openness measures used in columns 1 and 2 of Table 1.

The linguistic variable deserves comment. The historical evidence suggests that countries with homogeneous populations are more prone to build up labour market structures that are organised along collective lines. In a country with a polarised population – in terms of preferences, the distribution of abilities, etc. – it is more difficult to create encompassing institutions. One might also expect that polarised societies spend less on public goods, of which social insurance might be an example. To quantify the extent of homogeneity of a society, political scientists have for long relied on measures of linguistic fractionalisation. These measures have been introduced in the political economy literature by e.g. Mauro (1995), Easterly and Levine (1997), and Alesina and Wacziarg (1998).

The benchmark regressions of Table 1 are not easy to reconcile with the conventional view. In fact, not a single one of the eleven estimated coefficients on log

Openness suggests that there is an inverse relation between international trade and the extent of institutional involvement in the labour market. If anything, the relation appears to be of the opposite sign. After controlling for initial GDP and linguistic fractionalisation, Log Openness is positively and significantly correlated with (i) the generosity of social insurance (columns 1 and 2), (ii) union density, employer coordination, and the centralisation of wage bargaining (columns 5, 7, 8), and (iii) level of minimum wages (column 9). Finally, the coefficient reported in column 11 indicates that open economies have a significantly more compressed distribution of disposable income.

Linguistic fractionalisation is negatively and significantly correlated with all the four variables that measure the strength, centralisation, and coordination among the parties of the labour market (see columns 5-8). The potential role of linguistic fractionalisation is illustrated by the case of Belgium, an open economy, which also happens to have a high rank on the fractionalisation index. The point estimates of column 5 indicates that if Belgium had the Swedish index-value of .065 instead of its actual value of .364, its union density rate would have been 63.5 percent, which can be compared with Belgium's actual union density rate of 51 percent.

There are many reasons to be cautious about my regressions. A basic issue is reverse causation. My measure of openness is based on actual trade volumes, which can be affected by country-specific institutions. Table 3 shows the results when we replace the log of the actual trade share with the log of the constructed trade share of Frankel and Romer (1999). As their imputed trade share ("natural openness") is based on geographic factors (like a country's area in square meters, distance to other countries, etc.), it can be interpreted as a measure of a country's exogenous trade. There is no indication that the results are driven by reverse causation. The coefficient on openness has the same signs in both Table 1 and Table 3, and the significance levels are more reassuring in the latter one.

Some authors have suggested that country size has an independent effect on the incentive to form institutions. Alesina and Wacziarg (1998) argue that large countries have a smaller public sector relative to GDP, and Wallerstein (1989) report evidence suggesting that union density is lower in countries with a large labour market. Since a country's trade share is correlated with its size, my finding of a non-negative association between openness and institutional involvement could simply be a spurious one, due to my omission of a measure of size. I have therefore run regressions where I added (the log of) population size to the explanatory variables of Table 1. This modification (not shown) does *not* change the sign of any of the eleven estimated coefficients on log Openness. But it weakens the statistical significance of openness, which remains significant in only two of the estimated equations. The size variable, in turn, is significant in one of the estimated equations. Since log Openness and log Population are highly correlated, it is difficult to obtain precise estimates of their coefficients. Because the collinearity between population size and the Frankel-Romer instrument of exogenous trade is less high, I obtain more precise estimates when I add log Population to the explanatory variables of Table 3.[18] As shown in Table 4, the sign of the openness coefficient remains unchanged in all specifications, and statistically significant in six of them (the size variable is significant in four regressions). Thus, the non-negative relation between trade and institutions does not appear to be due to the omission of a measure of country size.

Finally, I have explored whether the results are driven by observations for the USA, an outlier in cross-country studies of institutional design. But when I added a US-dummy to the regressions of Tables 1, 3 and 4, not a single one of the 33 coefficients on log Openness changed sign (and 20 remained significant at the 10 percent level).

[18] When I regress log Openness measured by the actual trade share against log Population and a constant (for the twenty countries that constitute the sample of Nickell and Layard (1999)), I obtain an adjusted R^2 of .52. When I repeat the exercise for the measure of Frankel and Romer (1999), I obtain an adjusted R^2 of .32.

4.2 Some "dynamic" observations[19]

It is also of interest to study how labour market institutions have *changed over time* in response to globalisation. For this purpose, data from the 1960s and 1970s is important, since indicators of international trade suggest that economic integration gained momentum in the 1960s and early 1970s. As observed by Blanchard and Wolfers (2000, p. C16) there was also an increase in "unemployment-unfriendly institutions" in the late 1960s and early 1970s. This apparent co-movement does not say anything about causation; it may simply indicate that there is some underlying common trend (like a general radicalisation of the political climate towards the late 1960s and early 1970s) that drives institutions in all OECD-countries. But provided that there is such a common trend, and provided that the popular view is right in predicting that increased openness makes it more difficult to maintain rigid institutions, we would expect a lesser increase in "unemployment-unfriendly institutions" in countries that became more open relative to others during this period.

Since there is a lack of data on the evolution of labour market institutions over time exploring this issue is difficult. The data set of Nickell and Layard (1999) shows how institutions vary between countries, but it does not shed light on the evolutionary aspects. However, Blanchard and Wolfers (2000) – building on OECD (1999b) and Lazear (1990) – construct a time-varying index of the strictness of job protection since 1960, and this is what I use in the following. The index of Blanchard and Wolfers is a cardinal one, ranging theoretically from 0 (no job protection) to 6 (maximum protection), and empirically from 0 to 4.[20] As in the previous section, my measure of openness is taken from Penn World Tables, mark 5.6. I confine attention to the 20 OECD-countries that constitute the core of the analysis of the previous section (see the Appendix for a listing).

[19] I am grateful to one of the referees for suggesting the following extension.
[20] The data set of Blanchard and Wolfers (2000), and an appendix describing the construction of their time-varying index of job protection, can be downloaded at http://web.mit.edu/blanchar/www.articles.htlm.

The raw data for these 20 countries underscores that international trade integration gained momentum during the 1960s. In 1960 the average share of trade (exports plus imports) to GDP was 0.46, which is very close to the average trade share in 1950. Fifteen years later, in 1974, the trade share had increased substantially to 0.61. In 1990, finally, the trade share had increased modestly to 0.63. Between 1960-74 the trade share increased the most in Belgium, Ireland and Portugal, and the least in Australia, Denmark, Japan and the USA. The job protection index of Blanchard and Wolfers (2000) suggests that overall job protection got stricter during the same period. Their index for the 1960-64 period took a value of 1.48 for our 20 countries, and in the 1975-79 period their index had increased to 2.26. For our purpose, the interesting observation is that the job protection index increased the most (and *not* the least) in those countries that got the most open, see Figure 2. Moreover, the simple correlation between the change in openness between 1960-74 and the change in the job protection index is 0.52.

4.3 Summing up the cross-country evidence

Recent years have seen an explosion of cross-country studies of the relation between institutions and indicators of aggregate economic performance. By now the limited nature of the lessons that can be drawn from such exercises is clear. Because of my small sample, and because of hard-to-remedy problems concerning endogenous explanatory variables and omitted variables, the correlations that I report should not be interpreted as indicators of causal relationships. Even so, I conclude that my empirical analysis shows that the link between trade integration and labour market institutions is a great deal more subtle than is predicted in the popular debate. To the extent that my correlations are at all informative

about the future, the message seems to be that there is no reason to suppose that increased trade integration will automatically weaken the institutions of the labour market.[21]

5. The labour market implications of the new economy

In the popular debate it is common to argue that the computerised economy will join forces with globalisation in an assault on redistributive labour market institutions. However, the simple framework of Figure 1 serves to remind us that there are both costs and benefits associated with these institutions. As was the case with globalisation, it is probably true too that new technology tends to increase the costs of certain labour market institutions; i.e. the marginal cost curve shifts upwards, which tends to reduce the amount of redistribution demanded by the decisive voter/union member. But at the same time one cannot rule out that computerisation also leads to an upward shift in the marginal benefit curve, which tends to increase the amount of redistribution. Times of rapid technological change are also times when old skills erode rapidly, and when investments in human capital depreciate at a higher – and probably more erratic – rate. Therefore, one might conjecture that the demand for institutions that protect the returns from human capital increases in periods of technological breakthroughs (of which the new economy is an example).

It is true that this prediction does not appear to fit the facts. Those sectors of the economy that so far have been the most affected by computerisation and the web are also to the ones where labour market relations are the most flexible, in terms of methods of pay, incidence of individual bargaining, work hours, etc. But in my view, it is premature to say anything definite about the labour market implications of the new economy until this

[21] There are clearly other aspects to globalisation than output trade – aspects on which my regressions cast no light. Schöb and Wildasin (1998) investigate the effects of international worker mobility in a model with long-term labor contracts that lead to wage rigidities and unemployment. In this model increased mobility leads to more flexible labor market institutions. However, as discussed by Krueger (2000) it is not clear that labour mobility between European countries is on the rise.

sector has lived through its first major crisis. After all, in Massachusetts and Sweden it appears that the industrial "panic" of the late 19th century, rather than industrialisation *per se*, provided the crucial impulse to create labour market institutions.

6. Conclusions

In this paper I have argued that labour market institutions have as much to do with social insurance of otherwise uninsurable risks as with rent seeking and vested interests. I have also argued that this insight fundamentally changes the positive analysis of how union members, and the electorate at large, may respond to the uncertainties associated with rapid structural change and globalisation.

From a normative perspective it is important to note that the fact that an institution originally served a useful purpose (protection against income uncertainty) does not mean that there are no better institutions today. It seems clear that many of today's labour market institutions are designed in ways that impose considerable dead-weight losses, at small or no gains in social protection.

In sorting out the bad institutions from the good ones, and in finding ways of reforming the bad ones, policy-makers may have much to gain from the advice of the economist. It is noteworthy that so far most of this advice has been based on models where there are no market failures, and hence no compelling efficiency argument for labour market institutions in the first place.[22] Developing models of labour market institutions where the rent seeking and social insurance mechanisms coexist seems like an important research topic for the future.

[22] For elaboration of this point, see Agell (1999) who focuses on union wage policy, Atkinson (1999) who focuses on unemployment insurance, and Pissarides (2001) who focuses on employment protection.

Appendix

The data sources for the dependent variables used in section 4.1 are as follows. The short- and long-run net replacement rates used in columns 1 and 2 of Tables 1, 3, and 4 are from the OECD (1999a), Tables 3.2 and 3.5. These calculations allow for the interaction of the tax and benefit systems (including unemployment benefits, family benefits and increased housing benefits). No social assistance is assumed to be paid, which reflects the assumption that the household has sufficient assets to be disqualified. To arrive at two aggregate replacement rates for each country, I have computed the arithmetic average for the different family types reported in columns 1-4 in each of these tables. Although net replacement rates are available for 26 countries, I exclude the Czech Republic from my regressions, the reason being that there is no information about linguistic fractionalisation in this country.

The dependent variables used in columns 3-10 come from Nickell and Layard (1999), NL, and they are available for 20 countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, Canada, the United States, Japan, Australia, and New Zealand. The variables Labour standards and Job protection rank are from NL, Table 6. Union density, Union coordination, Employer coordination, and Centralisation rank are from NL, Table 7. The variable Centralisation rank is taken from Calmfors and Driffill (1988). In its original form this ranking (which goes from 1 to 17) is constructed so that a lower rank signifies that the wage bargain is more centralised. Before I ran my regressions, however, I multiplied the Calmfors-Driffill ranking with –1, so that a more centralised wage bargain becomes associated with a higher rank. The variable Minimum to average wage is from NL, Table 9, supplemented with information for Switzerland from Dolado *et al*. (1996), Table 1. There are missing values for Japan and Australia. The variable Active labour market policy is from NL, Table 10. The 90/10 percentile ratio of disposable income

inequality in column 11 is taken from Gottschalk and Smeeding (1997), Figure 2. For most countries income inequality is measured in 1991-92. Compared with the 20 countries of NL, there are missing values for Japan, New Zealand, and Portugal.

The independent variables are from the following sources. Population, Openness (defined as the sum of actual imports and exports over GDP), and GDP per capita (in purchasing power parities) are from the Penn World Tables, Mark 5.6. These variables are measured in 1985 (columns 3-11 of my tables) or 1990 (columns 1 and 2). The constructed openness measure (defined as the sum of constructed imports and exports over GDP) used in Tables 3 and 4 is from Frankel and Romer (1999), Table A1. The index of linguistic fractionalisation is computed as an arithmetic average of five different indices of linguistic diversity, included in the data set of Easterly and Levine (1997).

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Figure 1. Effect of globalisation on redistribution in political economy equilibrium

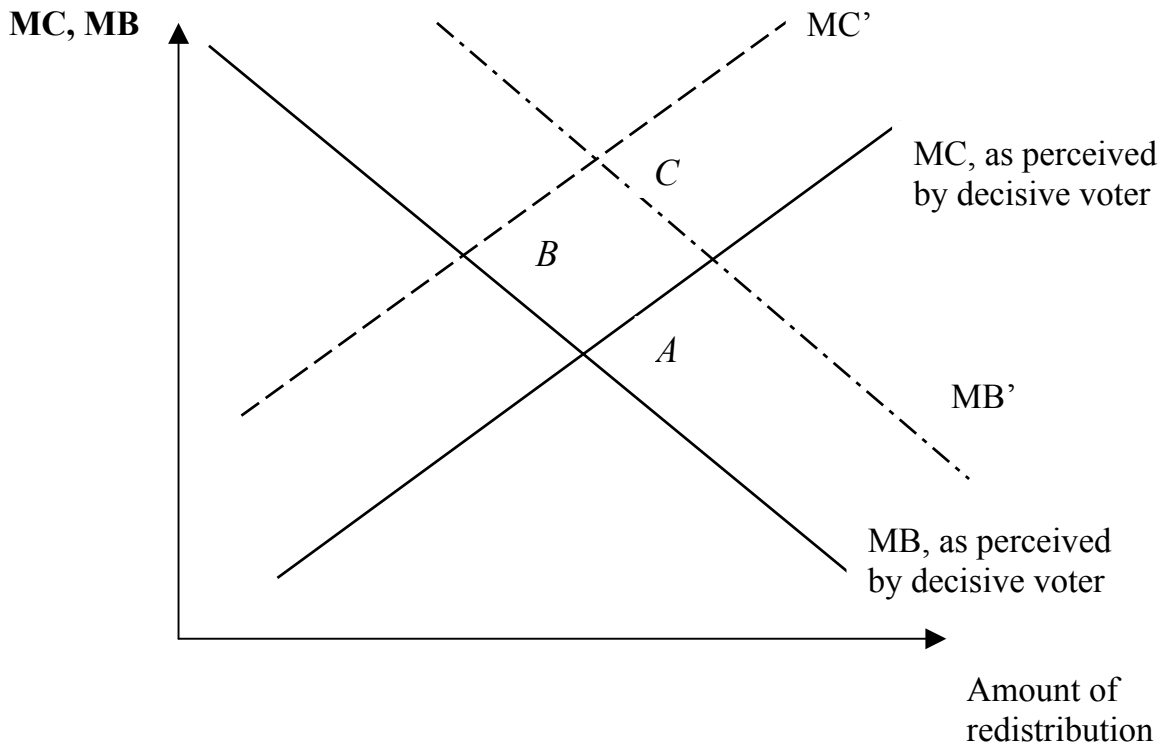
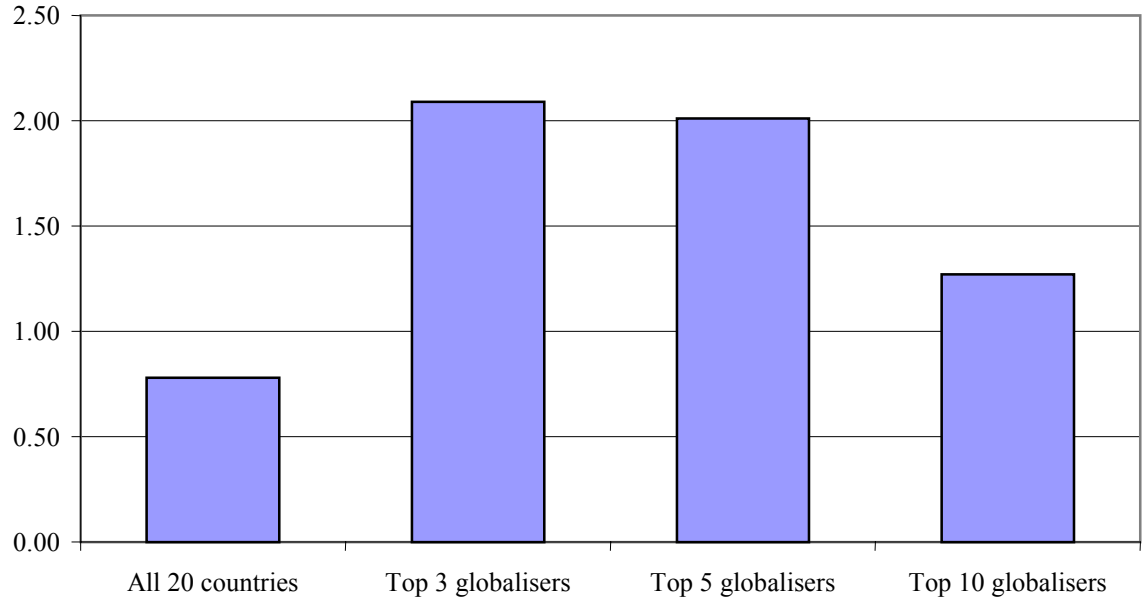


Figure 2. Increase in Blanchard-Wolfers index of strictness of job protection between early 1960s and late 1970s



Notes: The 20 countries are the 20 OECD-countries included in the data set of Nickell and Layard (1999), see the Appendix for a listing. I have ranked them according to the magnitude of the absolute increase in openness according to PWT 5.6 between 1960-74. The index of job protection is taken from the the data set of Blanchard and Wolfers (2000). For further information, see main text.

Table 1. Cross-country evidence on the determinants of labour market institutions

	DEPENDENT VARIABLES										
EXPLANATORY VARIABLES	Net replacement rate, short-run (1)	Net replacement rate, long-run (2)	Labour standards (3)	Job protection rank (4)	Union density (5)	Union coordination (6)	Employer coordination (7)	Centralisation rank (8)	Minimum to average wage (9)	Active labour market policy (10)	Disposable income inequality (11)
Constant	-100.210	-249.452	10.024	107.357*	-299.491*	-5.197	-14.752*	-84.528	-1.206*	-90.764	17.300
	(55.303)	(97.302)	(22.919)	(38.887)	(107.350)	(6.850)	(5.606)	(39.950)	(.419)	(107.238)	(9.760)
Log GDP/capita	14.172*	26.452*	-1.180	-11.241**	27.932*	0.627	1.482*	5.943	0.138**	8.069	-.957
	(5.579)	(9.817)	(2.213)	(3.822)	(9.611)	(0.674)	(.571)	(3.840)	(.034)	(10.541)	(1.018)
Log Openness	7.857*	14.723**	1.281	2.098	21.259**	0.412	.822**	5.524**	.118*	7.730	-1.225**
	(3.857)	(4.920)	(0.956)	(1.964)	(7.169)	(0.290)	(.256)	(1.620)	(.040)	(4.146)	(.368)
Linguistic fraction.	2.268	-45.000*	-2.397	-3.069	-66.828*	-3.537*	-3.707**	-23.739*	-0.447*	-32.061	2.006*
	(22.688)	(18.184)	(4.417)	(9.864)	(27.264)	(1.409)	(1.130)	(8.610)	(.179)	(21.298)	(.837)
Adjusted R^2	.242	.438	.004	.277	.261	.216	.323	.472	.418	-.008	.433
Number of countries	25	25	20	20	20	20	20	20	18	20	17

* denotes significance at five percent level
** denotes significance at one percent level.
Notes: White-robust standard errors are shown in parentheses. For a description of the variables, see main text and the Appendix.

Table 2. Linguistic fractionalisation and openness measure of 25 OECD countries

	Linguistic fractionalisation index (Easterly-Levine (1997) summary measure)	1990 trade share (exports plus imports divided by GDP) according to Penn WT 5.6 (in %)
Canada	.376	51.2
Belgium	.364	145.0
Switzerland	.308	72.3
Spain	.275	37.5
Luxembourg	.217	193.8
United States	.209	21.5
New Zealand	.148	55.3
France	.145	45.2
Australia	.113	34.4
United Kingdom	.106	51.5
Finland	.105	47.7
Ireland	.090	114.6
Greece	.078	54.2
Norway	.070	81.1
Hungary	.065	60.7
Sweden	.065	59.5
Netherlands	.063	103.7
Germany	.044	58.0
Poland	.039	45.8
Italy	.039	41.5
Austria	.033	79.2
Denmark	.028	65.3
Japan	.010	20.9
Portugal	.003	75.2
Korea	.000	62.5

Table 3. Exogenous measure of 'natural' openness (Frankel and Romer (1999))

	DEPENDENT VARIABLES										
EXPLANATORY VARIABLES	Net replacement rate, short-run	Net replacement rate, long-run	Labour standards	Job protection rank	Union density	Union coordination	Employer coordination	Centralisation rank	Minimum to average wage	Active labour market policy	Disposable income inequality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	-83.084	-209.791*	11.195	99.158*	-204.608	-4.928	-14.455*	-67.505*	-.899*	-61.817	17.129*
	(50.680)	(91.547)	(18.096)	(34.530)	(104.414)	(5.878)	(6.034)	(28.086)	(.368)	(95.098)	(7.758)
Log GDP/capita	14.186*	26.174*	-1.067	-10.257*	23.841*	.672	1.591*	5.483	.130**	7.021	-1.211
	(5.421)	(9.720)	(1.900)	(3.599)	(10.917)	(.617)	(.627)	(2.882)	(.038)	(10.152)	(.811)
Log Openness	4.845**	7.410*	1.060*	2.688*	10.502*	.351*	.723**	3.446**	.085**	4.341	-.843**
	(1.112)	(3.346)	(.045)	(1.000)	(4.387)	(.150)	(.125)	(.953)	(.019)	(2.147)	(.208)
Linguistic fraction.	6.970	-35.587*	-1.366	-1.110	-51.706	-3.202*	-3.033**	-19.607*	-.347	-26.415	1.054
	(20.403)	(17.087)	(4.060)	(8.714)	(31.238)	(1.240)	(.711)	(7.386)	(.168)	(19.961)	(1.002)
Adjusted R^2	.280	.332	.082	.393	.150	.300	.590	.486	.517	-.026	.549
Number of countries	25	25	20	20	20	20	20	20	18	20	17

* denotes significance at five percent level
** denotes significance at one percent level.
Notes: White-robust standard errors are shown in parentheses. For a description of the variables, see main text and the Appendix. Log Openness is here defined as the log of the constructed trade share, taken from Frankel and Romer (1999), Table A1.

Table 4. Natural openness versus country size

	DEPENDENT VARIABLES										
EXPLANATORY VARIABLES	Net replacement rate, short-run	Net replacement rate, long-run	Labour standards	Job protection rank	Union density	Union coordination	Employer coordination	Centralisation rank	Minimum to average wage	Active labour market policy	Disposable income inequality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	-84.137	-146.148	9.773	71.227*	-75.532	-4.669	-14.620*	-52.576	-.952*	-49.309	15.111
	(65.435)	(97.970)	(17.474)	(26.921)	(80.444)	(6.211)	(6.794)	(31.589)	(.373)	(89.198)	(10.210)
Log GDP/capita	14.216*	24.460*	-1.069	-10.303**	24.057**	.672	1.590*	5.508	.130**	7.042	-1.140
	(5.727)	(9.940)	(1.920)	(2.887)	(8.129)	(.642)	(.648)	(3.350)	(.041)	(10.418)	(.961)
Log Openness	4.922	2.791	1.169*	4.822**	.641	.331	.736**	2.306*	.089**	3.386	-.733**
	(2.630)	(3.478)	(0.455)	(1.046)	(5.053)	(.193)	(.176)	(.874)	(.021)	(2.587)	(.199)
Linguistic fraction.	6.964	-35.209	-1.334	-.493	-54.560	-3.208*	-3.030**	-19.937*	-.347	-26.691	1.036
	(20.912)	(18.540)	(4.165)	(6.845)	(30.957)	(1.300)	(.727)	(8.201)	(.171)	(20.913)	(1.052)
Log Population	.059	-3.571*	.117	2.306*	-10.655**	-.021	.014	-1.232*	.005	-1.033	.107
	(1.976)	(1.351)	(.459)	(.817)	(2.830)	(.139)	(.122)	(.521)	(.019)	(2.068)	(.172)
Adjusted R^2	.244	.352	.024	.550	.470	.255	.563	.540	.483	-.085	.529
Number of countries	25	25	20	20	20	20	20	20	18	20	17

* denotes significance at five percent level

** denotes significance at one percent level.

Notes: White-robust standard errors are shown in parentheses. For a description of the variables, see main text and the Appendix. Log Openness is here defined as the log of the constructed trade share, taken from Frankel and Romer (1999), Table A1.